

**Telecommunications in
Sustainable Development:
A USAID Backgrounder**

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AUTHORS NOTE

The views expressed in this report are strictly those of the authors and do not necessarily represent the views of the United States Agency for International Development (USAID). This paper is designed to provide general background information and facilitate further discussion regarding telecommunications and sustainable development within the Agency.

TABLE OF CONTENTS

| | |
|--|-------|
| Introduction | 1-2 |
| I. Telecommunications and Sustainable Development | 3-9 |
| II. Donor Involvement in Telecommunications | 9-14 |
| III. USG Support for Telecommunications | 14-15 |
| IV. USAID Experience in Telecommunications | 15-30 |
| V. Conclusions | 30 |
| Appendix A: USAID Telecommunications Inventory | 31-38 |
| Appendix B: USAID Internal Use of Telecommunications | 39-40 |
| Bibliography | 41-42 |

INTRODUCTION

Technological advances, new applications, and changing regulatory frameworks are rapidly altering the telecommunications sector. The resultant transformation in the manner and speed by which information can be transmitted holds the potential to greatly impact civil and economic society. This "information revolution" has focussed increasing attention on the role of telecommunications in developing countries, as well as the shortcomings which presently exist.

Telecommunications, as broadly defined here, include electronic communication channels such as satellite, microwave, broadcast, cable, wire communications links, computer mediated communications and information access. From a USAID perspective, increased telecommunications capabilities and applications in developing countries are invaluable tools for promoting sustainable development. As defined by Administrator J. Brian Atwood, "...sustainable development is social and economic growth that enlarges the range of freedom and opportunity, not only day to day but generation to generation" (USAID 1994:1).

There are two aspects to the promotion of telecommunications for sustainable development: telecommunications capacity building and development telecommunications applications.

Telecommunications capacity building is the expansion of physical information resources including: (1) the creation of infrastructure, programming, institutional, policy and regulatory capacities for telecommunications systems, and (2) the enhancement of the awareness and skills among professionals engaged in all aspects of telecommunications. **Development telecommunications applications** is the application of technologies, combined with the personnel training needed to enable effective utilization, for the promotion of specific development goals. Combined telecommunications capacity building and development telecommunications applications can increase not only the capacity and efficiency of telecommunications systems but also their applicability to specific development problems, providing a new foundation for sustainable development.

Continuing its longstanding recognition of the importance of telecommunications both in and for development, USAID has conducted an assessment of Agency activities in this sector. This paper is intended to provide general background information on the role of telecommunications in sustainable development as discussed in the literature, and an inventory of USAID telecommunications activities. It does not purport to provide a complete analysis of this broad and complex issue, but rather is intended to elicit interest and further examination and discussion of telecommunications within USAID.

The paper is organized into five sections. The first examines some general issues surrounding telecommunications in developing countries as discussed in key topical literature. These issues include the existence of a gap between developing and industrialized nations in regard to telecommunications systems and access to information; the contributions of telecommunications to both economic and social growth; and the constraints to telecommunications capacity building in developing nations.

The second section examines the telecommunications activities of some major donors including the World Bank and the International Telecommunications Union (ITU), the Canadian International Development Agency (CIDA), and the Japan International Cooperation Agency (JICA) and International Development Research Centre.

The third section briefly assesses the activities of the United States Government (USG) in the telecommunications sector in developing countries. Issues are raised concerning USAID's potential role within a government-wide approach to telecommunications for sustainable development.

The fourth section examines USAID activities in the telecommunications sector. Agency activities in the areas of telecommunications capacity building and development telecommunications applications are addressed and a partial inventory of recent and current activities is provided. Because USAID does not maintain an internal tracking system for telecommunications activities and because there is a good deal of recent action in this area, this inventory does not include all relevant USAID activities. In addition, the lack of a coherent, Agency-wide approach to telecommunications, relative newness of certain categories of activity, and the paucity of evaluative materials targeting telecommunications make the identification of lessons learned difficult. A USAID Policy Determination on telecommunications, entitled *Telecommunications and the Global Information Infrastructure*, is, however, currently in draft stage. Finally, the last section draws some conclusions regarding USAID's activity in and approach to telecommunications and, more specifically, telecommunications in development.

I. TELECOMMUNICATIONS AND SUSTAINABLE DEVELOPMENT

THE INFORMATION GAP

Over the past decade, changes in regulatory frameworks, technologies, and applications have transformed the telecommunications sector. The telecommunications sector, in turn, is helping to transform the global marketplace and the ways in which individuals, firms, organizations, and nations interact. Value-added telecommunication services such as electronic and voice mail, electronic funds transfer, data-base services, videotext services, teleconferencing, data processing, telemetering and telecontrol services are now vital to both the manufacturing and service sectors. It is noteworthy that the service sector, the fastest growing economic sector, is heavily dependent upon telecommunications technologies and applications.

The growing importance of telecommunications in all sectors of the economy is primarily due to the fact that information is now considered a basic and vital factor in production. Telecommunications technologies and their application enhance the access to and flow of information within the economy. Facilitated by telecommunications, the information sector has emerged as an important component of the overall economy. For example, "the information economy accounted for one-third to one-half of GDP and employment in OECD countries in the 1980s and is projected to reach 60 percent in the European Community by the year 2000" (Wellenius and Stern, 1994:2). This vital sector is defined as comprising "all activities that involve the production, processing, and distribution of information, and knowledge, as distinct from physical goods" (Ibid.:54).

The developing world, however, is for the most part not taking part in this information revolution.¹ It can now be said that an extreme gap exists between the information rich and the information poor. Indeed, the 1984 Maitland Commission report (*The Missing Link: Report of the Independent Commission for World Wide Telecommunications Development*, ITU:Geneva, 1984), which was instrumental in increasing the focus on telecommunications in the developing world, noted that in most developing countries, the telecommunications system is not adequate to sustain even basic services. The extent of this gap is evident in the fact that main lines per 100 inhabitants in the industrialized world averaged 31.5 in 1988, while the level was 1.5 per 100 in the developing world (Saunders et al., 1993:6-7). A gap also exists between and within developing countries. For example, in Africa the average was 0.7 per 100, while in Latin America the figure was 5.9 per 100 (Ibid.:6-7). Disparities also occur within countries and regions, as urban inhabitants usually have the greatest access to telecommunications services. Developing nations also lag far behind in performance, typically measured in terms of exchange capacity, call completion rates, faults cleared within 24 hours, and waiting lists.

TELECOMMUNICATIONS AND ECONOMIC GROWTH

¹ The exceptions are the East Asian newly industrialized countries (NICs) which have rapidly developed their telecommunications sectors.

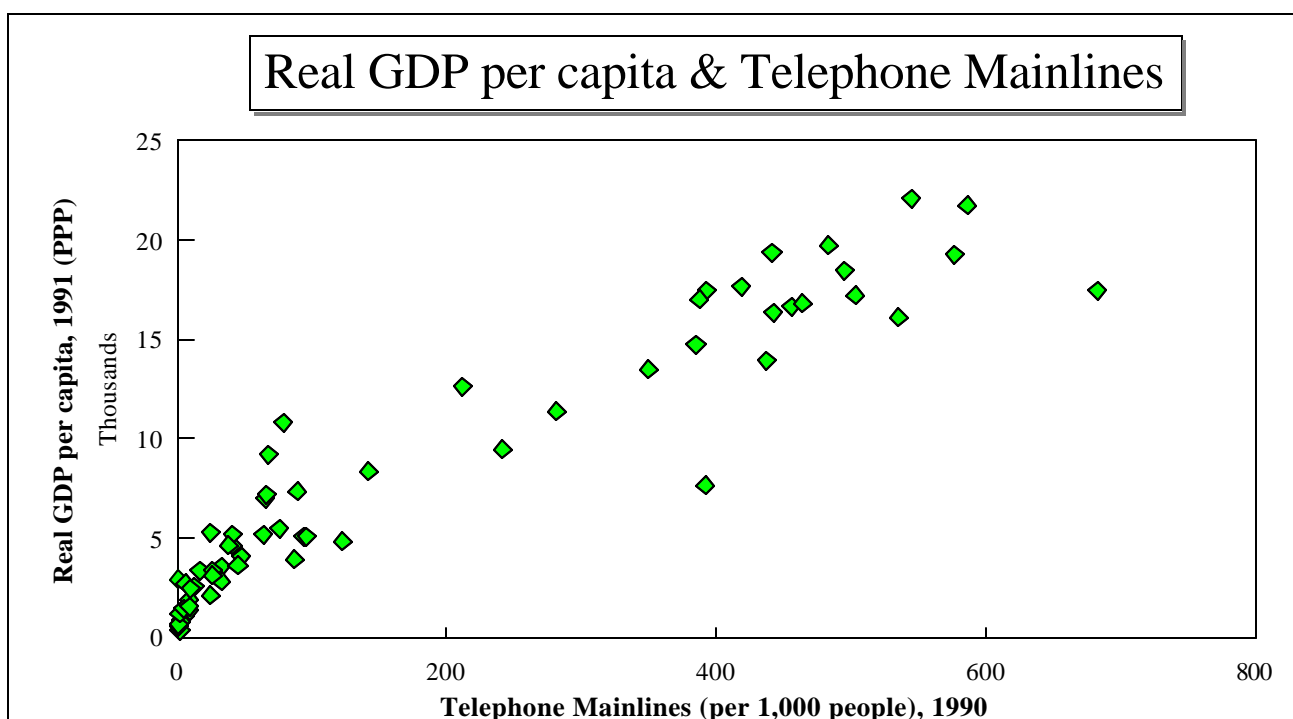
The lack of adequate telecommunications infrastructure and the resultant information gap threaten to have detrimental consequences for developing nations as telecommunications increasingly play an important role in economic development.

At the macroeconomic level, there is evidence that telecommunications infrastructure is strongly correlated to economic growth. The 1994 World Development Report indicates that a 1:1 relationship exists between infrastructure stocks and economic growth (World Bank, 1994:2); a one percent increase in infrastructure stock corresponds with a one percent increase in gross domestic product (GDP). As GRAPH 1 indicates (see pg. 5), a strong correlation also exists between the increase in basic telecommunications infrastructure (telephone main lines) and GDP.

Two differing explanations are offered for this correlation. First, increased provision and consumption of telecommunications services stimulates economic activity and thus growth. Second, more highly developed and specialized economies demand and consume more telecommunications services. Macroeconomic analyses since the 1960s have been unable to disprove either proposition. The empirical evidence suggests instead that there is a two-way causality between telecommunications capacity building and economic growth: telecommunications infrastructure is both a contributor to and manifestation of economic development.

At the microeconomic level, telecommunications facilitate market entry, improve customer service, reduce cost, and increase productivity. Looking at the firm, an International Telecommunication Union (ITU) study in Kenya identified nine mechanisms which could improve efficiency via access to extensive and reliable telecommunications services (ITU 1981): 1) facilitating business expansion; 2) increasing sales price; 3) improving purchasing decisions; 4) reducing inventories (promotion of just in time supply); 5) saving on transportation costs; 6) reducing distribution costs; 7) lowering managerial costs; 8) lowering labor costs; and 9) reducing down time. The study indicated that the greatest benefits would be realized in the area of cost reduction.

"Taken together, this evidence about firm-level gains supports theories rooted in the economics of information which, *a priori*, argue that communication, by reducing uncertainty, increases the probability of economic units making correct decisions and achieving their goals at less cost" (Ibid.:24). In essence, commerce is essentially an information processing activity. Effective buying, selling, and brokering rely on access to current information on the availability and prices of goods and services. The ITU study concluded, "it is clear that in developing countries, access to telecommunications services is a crucial factor affecting the performance of both individual economic units and of markets; telecommunications infrastructure is critical to industrial development" (Ibid.:3).



GRAPH 1

Source: U.N. Human Development Report, 1994: file: PLTLGDP.WK4

Increased telecommunications capacity also potentially addresses spatial problems in development by promoting more balanced development at the national level. Issues of vital concern to developing nations, such as rapid urban migration and the heavy concentration of employment in one or a few urban centers, could be mitigated by the provision of telecommunications services in rural or secondary urban areas. Research conducted in industrialized nations during the 1970s indicates that increased investment in telecommunications capacity can have pivotal implications for the location of economic units. It is important to note, however, that "introduction (of telecommunications capabilities) needs to be linked to other (policy reforms) which increase the financial incentives of moving ... or make organizations in a region functionally more interdependent" (Goddard & Pye, 1977:29).

Just as telecommunications capacity building enhances the prospects for economic development, the lack of adequate telecommunications infrastructure can pose severe constraints. Lack of telecommunications infrastructure can be a detriment to foreign direct investment (FDI) which continues to be of great importance to developing nations. On a more general level, it can be argued that countries that fail to develop sufficient telecommunications capabilities face the very real possibility of even further marginalization in an increasingly integrated and technologically-oriented global economy.

TELECOMMUNICATIONS AND SOCIAL GROWTH

Telecommunications are not only important to economic development but also contribute to other areas of national development such as education, health, democratization, and natural resource management which together embody social growth. Evidence of the relationship between telecommunications capacity building and overall development on the national level is exhibited in GRAPH 2 (see pg. 8). This graph depicts a strong correlation between the extent of physical telecommunications infrastructure and the Human Development Index (HDI), a composite measure of several development indicators including life expectancy, adult literacy, schooling and real GDP per capita. As illustrated by the graph, a small

increase in telephone mainlines initially corresponds to a large increase in the HDI value. As a country accumulates more telephone mainlines, however, the marginal increase in HDI declines. This finding suggests that, although extensive telecommunications capacity building is associated with advanced economic development, the provision of basic services may be sufficient to provide increases in other development indicators and thus positively impact social growth. This proposition suggests the need for further research in this area.

Telecommunications can yield benefits in several important social sectors in the developing world. For example, in the health care field increased telecommunications capabilities can afford rural areas greater access to health care expertise by enabling local personnel to consult quickly with experts located in urban centers. Paraprofessionals in rural areas can access training through distance learning programs. Increased access to telecommunications could also increase administrative efficiency in ordering supplies, transferring records, coordinating staff travel, and evacuating emergency patients (Hudson, 1994:340-344). Telecommunications can also be used to provide training and education to the general public and to promote increased environmental sustainability by expanding the dissemination of technical information and helping to monitor and maintain the inventory of natural resources. Telecommunications capacity building, however, does not ensure that all people will benefit. Indeed, those lacking in education, working in small industry, or living in isolated areas may be unaware or incapable of benefiting from improved telecommunications capabilities at the national level. Development telecommunications applications can be effective in introducing relevant technologies to promote a specific development objective and can also ensure that the requisite human capacity building occurs, allowing people to reap the benefits of increased telecommunications capacity. This underscores the importance of the dual promotion of both telecommunications capacity building and development telecommunications applications.

CONSTRAINTS TO TELECOMMUNICATIONS CAPACITY BUILDING IN DEVELOPING NATIONS

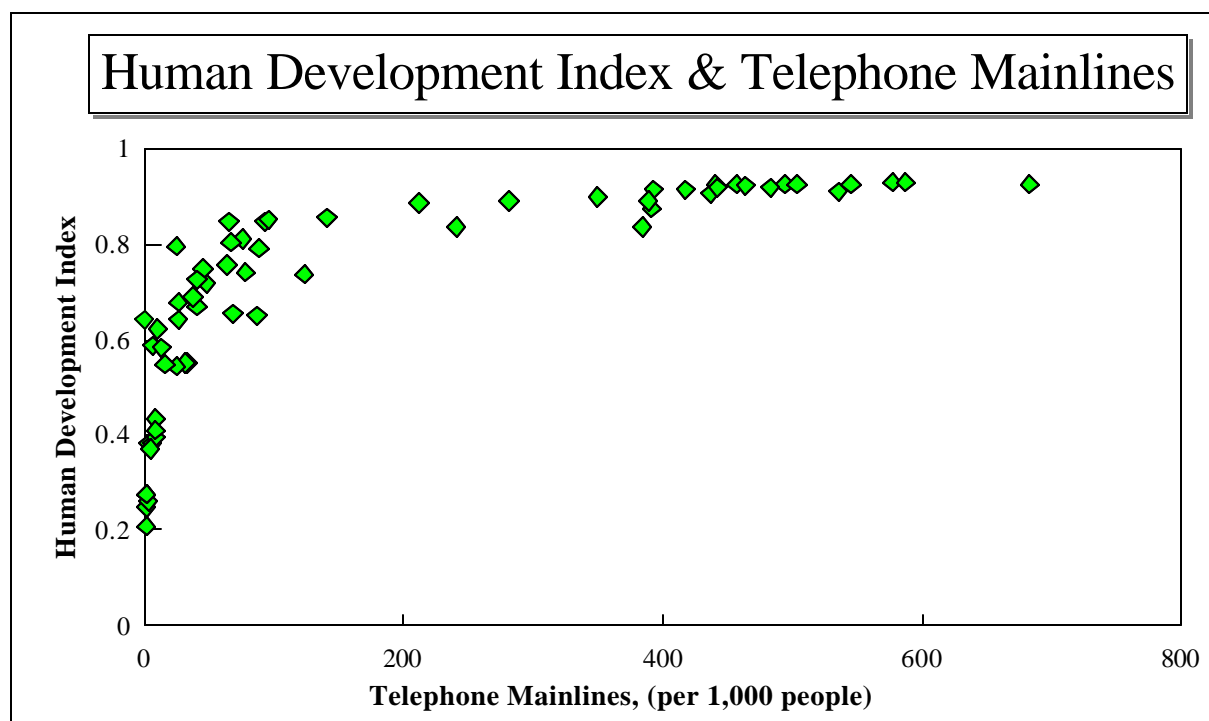
In many cases, developing nations are attempting to devote resources to telecommunications capacity building. From an average level of only 0.3 percent of GDP in the late 1970s, developing nations' investment in telecommunications grew to approximately 0.6 percent, or \$12 billion per year, by the end of the 1980s (Saunders et al., 1994:5). This investment level approaches that in the industrialized world but the vast differences in GDP lead to a continuation of the wide gap in telecommunications

capabilities. Indeed, throughout the literature the telecommunications sector in the developing world is commonly referred to as suffering from underinvestment.

The evidence demonstrates that the demand for services far outstrips supply: therefore, the phenomenon of underinvestment cannot be explained through lack of demand. For example, a survey conducted in developing countries during 1985-1989 indicates that on average only 68 percent of expressed demand for telecommunications was met (Saunders et al., 1994:5). Further, demand is typically expected to increase as more businesses and individuals are exposed to basic telecommunications services and thus, at least initially, investment can be expected to lead to increased demand.

Economic rates of return derived from telecommunications investments provide additional evidence of both the underinvestment in and the economic benefits of telecommunications. An internal assessment of 13 World Bank projects in the telecommunications sector indicates that the rate of return to the economy as a whole ranges from 15 percent to 30 percent (Ibid.: 16). Such high rates of return indicate that investments in telecommunications are justified and indeed should continue until returns diminish. Furthermore, USAID studies indicate that when appropriate pricing policies are in effect, satisfactory financial rates of return also can be expected.

Several reasons for the ongoing underinvestment can be posited. Sectoral policies such as pricing policies, intended to provide indirect subsidies, provide little incentive to contain costs and limit the opportunity to reinvest earnings. The lack of adequately developed capital



GRAPH 2

Source: U.N. Human Development Report, 1994: file: PLTLGDP.WK4

markets in the developing world reduces access to needed capital funds. Poor organization, management and training within telecommunications entities also can discourage investment.

These and other constraints must be addressed before developing nations can realize the widely recognized economic and social benefits of telecommunications. In subsequent sections, the activities of several major multilateral and foreign donors in the telecommunications arena are discussed. United States Government (USG) activities are then described followed by an in-depth examination of the activities of USAID.

II. DONOR INVOLVEMENT IN TELECOMMUNICATIONS

The following section describes the types of projects donors fund and, where possible, highlights key findings and lessons learned. While several multilateral banks and bilateral donors provide support to developing countries in telecommunications, this section is limited to the donors for which information is readily available. Sources used include project and document descriptions from various databases and Annual Reports of donors. The World Bank, the largest source of multilateral financing for telecommunications (Saunders et al., 1994:76), has recently changed its focus in this sector and now emphasizes policy reform and private sector participation. Other multilateral banks that have funded telecommunications include the Inter-American, Asian, and African Development Banks. Together with the World Bank, these organizations accounted for about five percent of telecommunications funds invested in developing countries in the 1980s (Saunders et al., 1994:76). This section, however, examines only the multilateral financing activities of the World Bank because the information on its experience in this sector is the most complete.

With regard to bilateral donors, both Canada and Japan have played important roles in funding telecommunications projects because of their level of telecommunications technology. These projects provide investment opportunities for Canadian and Japanese firms. In addition to funding infrastructure, both Canada, through the International Development Research Centre (IDRC), and Japan, through the Japan International Cooperation Agency (JICA) have also supported training. JICA, as well as the International Telecommunications Union (ITU), a U.N. Agency, have assisted in setting up telecommunications training centers around the world. Other funding for telecommunications projects has come from France, Sweden, Finland, Denmark, and Germany. The following section will focus on the projects of Canada and Japan in this sector as well as the training activities of the multilateral ITU.

WORLD BANK

Between 1951 and 1992, the World Bank lent approximately US\$5.6 billion for 128 telecommunications projects. In addition, it has disbursed about US\$1.6 billion in loans for public enterprise reform projects which include a telecommunications component (World Bank, 1993:1). Telecommunications projects account for about two percent of World Bank lending. In general, the Bank provides funding for telecommunications only when lending from other sources is not available on reasonable terms. Bank loans and credits usually finance 15-50 percent of total project cost, currently averaging about 20 percent (Wellnius et al., 1993:5).

Since the 1980s, a shift has taken place in World Bank lending for telecommunications development (World Bank, 1993:14). Prior to this period, lending focused on the following:

- ! Program design (least-cost) and implementation
- ! Efficiency of Procurement

- ! Financial and managerial autonomy of telecommunications agency (including separation of Posts and Telecommunications).

The new agenda has emphasized the following:

- ! Sector structure and regulation;
- ! Promotion of competition;
- ! Private sector participation;
- ! Restructuring and/or privatization of the main telecommunications agency.

Policy reform is an important facet of the Bank's new agenda. Whereas the older projects emphasized institution building of the main public telecommunications agency, the new approach emphasizes structural sector reform including privatization (in some cases) and setting up regulatory institutions (World Bank, 1993:ii). The shift in World Bank focus stems in part from changes in the telecommunications sector, such as technological advances and privatization in industrialized nations. In addition, the challenges faced by developing countries in the telecommunications sector could not be addressed by the priorities of the old agenda alone. For example, improvements could not be made by simply focusing on institution-building in the main telecommunications agency.

In 1993, the Bank published a review of its experience in the telecommunications sector from the early 1970s to the late 1980s. Ninety percent of completed telecommunications projects were rated satisfactory in project completion reports, a rating substantially better than for either Bank projects as a whole or other infrastructure projects (World Bank, 1993:16-17). In addition, 88 percent of the projects were considered to be sustainable. The report also lists some key findings and lessons learned, including the following:

- ! Promoting competition in the telecommunications sector in developing countries may be difficult due to factors such as weak governance, lack of regulatory skills and tradition, and the power of large, local industrial groups.
- ! The Bank should not underestimate the difficulties and time required to establish a functioning regulatory body in developing nations since there is a lack of experience in regulation in these countries.
- ! Recent sector developments in telecommunications have paved the way for increased private sector participation. However, private ownership alone does not guarantee improvement if there is no effective policy and regulatory framework.
- ! There is a discrepancy between the satisfactory outcome of the telecommunications projects and the persistence of severe problems in the telecommunications sector. This discrepancy

underscores the limits of the Bank's focus on institutional development and the need to address policy reform issues in the sector (such as the role of the private sector).

- ! Important time and resources have been devoted to procurement work. The experience gained from several projects, including Indonesia and Guatemala, has helped to successfully simplify procurement procedures and can be applied to other projects.

Coming challenges the Bank faces in this sector include the following (Wellenius et al., 1993:11-20; World Bank, 1993:48):

- ! Recognizing and building constituencies for reform;
- ! Dealing with social objectives (e.g., should the Bank develop a policy on rural telecommunications?);
- ! The impact of continued technological changes;
- ! Issues related to whether the bank should lend to private or newly privatized telecommunications utilities.

CANADA

The *Canadian International Development Agency (CIDA)* has provided funding for telecommunications since its earliest days (CIDA, 1986:35). Many of CIDA's telecommunications projects are sub-components of larger projects such as telecommunications systems for forestry, fishing, air transportation, railways, and agriculture. Main sub-sectors include telephony, air navigation, remote sensing, and satellite systems. Most of the work CIDA undertakes in a telecommunications project is contracted out to Canadian consulting engineers and equipment suppliers, and the recipient country provides local components as required (CIDA, 1986:36).

Canadian assistance to developing countries in this sector is significant because Canada has played a leading role in developing telecommunications technology (CIDA, 1986:46). In the 1970s, Northern Telecom, located near Toronto, Ontario, became the first company to develop switching and transmission systems handling voice communication in the form of digital pulses rather than traditional sound waves (CIDA, 1986:46). In the Caribbean, almost every country now uses digital products and systems, including fiber optics systems, developed by Northern Telecom. In this region, CIDA worked together with agencies such as the Canadian federal Export Development Corporation (EDC) and the U.S. Export-Import Bank (CIDA, 1986:47).

In Turkey, Northern Telecom has been a partner in a joint venture with the Turkish post, telegraph, and telephone administration, an initiative which received funding from CIDA and EDC. This joint venture company operates the largest research and development organization in the country, has developed its own telecommunications products for domestic and export markets, and is a licensee for Northern Telecom's digital telephone switching systems (CIDA, 1986:47). Northern Telecom also helped to

install a modern telephone system in Grenada (DAC Database Search:9-10). An evaluation of the project deemed it highly successful, and key lessons learned include:

- ! Agreements must clearly define the scope of work, the obligations of the parties, and the expected outputs;
- ! The recipient country or its executing agency must be a full partner in development;
- ! Training, human resource development, and technology transfer are required to ensure sustainability of a project.

In addition, CIDA has funded several rural telecommunications projects. A project in the Philippines, for example, provided rural telephone service to remote areas of the country. The major finding of this project was that calling patterns, power reliability, and microwave path clearance were not adequately assessed and factored into the engineering phase (DAC Database Search:14-15). CIDA also funded a project in Zimbabwe that installed a microwave transmission system (CIDA, 1986:51).

The *International Development Research Centre (IDRC)*, a public corporation created by the Parliament of Canada in 1970, supports programs which help developing countries increase the scientific capacity of their institutions and researchers (IDRC, 1993:1). One area focussed on by the IDRC is information and communications for environment and development. It has provided funding to create and support international networks through which developing countries can share experiences. For example, it funded a project to establish a computer-linked research network in Latin America for scientists involved in the production of brucellosis vaccines and diagnostic reagents. The networking system connected institutes in Latin America and Canada (IDRC Database Search:43).

IDRC also provided support to the Latin American Institute for Transnational Studies to conduct research on and experiment with a microcomputer-based communications network among non-governmental organizations (NGOs) in Mexico, Brazil, Peru, Argentina, and Chile (IDRC Database Search:41). In Asia, an IDRC-funded project promoted the development and use of computer communications technologies by non-governmental organizations involved in grassroots development. As a result of the project, electronic mail became more widely used by NGOs in Asia (IDRC Database Search:52).

Several IDRC projects also focus on using indigenous information. For example, a networking project in Africa was designed to improve access to electronic information, particularly information originating in Africa, and to promote regional and international interpersonal communication within Africa (IDRC Database Search:82). In Mexico, IDRC provided funding to the Latin American Institute for Transnational Studies to conduct research on the development and use of national databases through cooperation and computer-based networking. The main goal was to promote greater use of Mexico's indigenous information and communications resources (IDRC Database Search:70).

JAPAN

Through the *Japan International Cooperation Agency (JICA)*, Japan has played an important role in funding telecommunications projects and providing technical cooperation in the developing world because of its own level of telecommunications technology. Since Japan has developed its telecommunications networks over a relatively short period of time, compared to Europe and North America, it can share its own experience with developing countries (Japan's ODA, 1991:131).

In 1990, the majority of Japan's funding took the form of loan aid, as opposed to grant aid or technical cooperation, since the projects required large-scale investment over long periods of time (Japan's ODA, 1991:131). From 1986-1990, Asia received the highest share of Japanese loans in this sector (80.1 percent), followed by Africa (11.1 percent), Latin America (6.7 percent), and the Middle East (2.1 percent). Most of the projects involved improving telecommunications infrastructure and included plans for developing or expanding networks.

Many of the projects funded by JICA also involve training (IDRC Database Search:1-8). The training focussed on areas such as:

- ! digital telecommunications;
- ! telecommunications engineering (switching, telegraph, outside plant and power);
- ! telephone switching engineering;
- ! satellite communication;
- ! optical fiber cable transmission.

Several JICA-funded projects supported training institutes. For example, JICA gave a grant to the National Institute for Research and Training in Telecommunications in Peru for training in television and radio broadcast engineering, telephone system engineering, transmission engineering, microwave system design, and the maintenance and operation of microwave, among other areas (IDRC Database Search:2-3). JICA also funded a telecommunications training institute in Manila for engineers and technicians, and several participants were trained in Japan (IDRC Database Search:1-2). In addition, JICA has funded several projects involving educational television programming. In Mexico, for example, JICA provided training to the technical and production staff of Mexican television organizations to promote the development of educational television production and broadcasting in the country. Among the subjects taught were TV camera, lighting, video and VTR engineering, audio engineering, post-production and editing, and maintenance of equipment (IDRC Database Search:7).

INTERNATIONAL TELECOMMUNICATIONS UNION

The *International Telecommunications Union (ITU)*, a specialized agency of the United Nations based in Geneva, is an international organization responsible for the "planning, coordination, regulation, standardization, and development of world-wide telecommunications" (CIDA, 1986:48). Member countries contribute funds to this organization. A major focus of ITU's work is training, and over the past 20 years it has been involved in setting up national training centers in various parts of the world

(CIDA, 1986:48). Funding for these training centers has also been provided by the U.N. Development Program (Saunders et al., 1994:69). Through its Technical Cooperation Department, the ITU has been involved in developing training methods and techniques to help countries analyze their problems, survey their training requirements, and develop training programs (CIDA, 1986:48).

III. USG SUPPORT FOR TELECOMMUNICATIONS IN DEVELOPING NATIONS

The United States Government (USG) has a long tradition of supporting international telecommunications capacity building as a means of promoting sustainable economic growth and improving the quality of life in developing nations. The USG has committed substantial financial resources to international communications development in the form of export credit and guarantees, loans and investment guarantees, grants, training, technical assistance, and feasibility studies.

In March 1994, Vice President Gore reiterated this commitment in an address to the first Development Conference of the ITU in Buenos Aires, Argentina. The Vice President called for all nations to contribute to the development of a Global Information Infrastructure (GII) from which all countries can "derive robust and sustainable economic progress, strong democracies, better solutions to global and local environmental challenges, improved health care ...and -- ultimately -- a greater sense of shared stewardship of our small planet" (White House, 1994:1). The Vice President identified five principles on which the creation of the GI should be based:

- ! encouraging private investment;
- ! promoting competition;
- ! creating a flexible regulatory framework that can keep pace with rapid technological and market changes;
- ! providing open access;
- ! insuring universal service.

USG agencies provide support for international telecommunications in several areas, including promoting trade and investment in telecommunications goods and services, policy and regulatory reform, and training and technical assistance.² USG agencies active in the area of international telecommunications include:

- ! The Export-Import Bank (Ex-Im Bank)
- ! Federal Aviation Administration (FAA)
- ! National Science Foundation (NSF)
- ! National Telecommunications and Information Administration (NTIA)

² For additional information on the Activities of the identified USG agencies in telecommunications development see; *U.S. Government, Private Sector, Non-Profit, and Academic Contributions to Communications Development*, Information Infrastructure Task Force, July 1994.

- ! Overseas Private Investment Corporation (OPIC)
- ! Rural Electrification Administration (REA)
- ! U.S. Department of State
- ! U.S. Information Agency (USIA)
- ! U.S. Trade and Development Agency (USTDA)

As the principal agency for bilateral assistance to developing nations, USAID has the opportunity to play a key role in the U.S. government-wide approach to telecommunications in development. USAID's comparative advantage rests primarily in its longstanding in-country presence as well as in the breadth of its activities undertaken in the telecommunications sector. USAID is already playing a key role in certain countries, as illustrated by project descriptions provided in subsequent sections. For example, in the Philippines, USAID is working with the Ex-Im Bank to create a Concessional Financing Facility (CFF) to finance U.S. goods and services for telecommunications infrastructure. In Africa, USAID is working with the NTIA in implementing the "Regional Telecommunications Restructuring Project." In addition, USAID is or has been collaborating with the Department of State Communications and Information Program (State/CIP) and the Federal Communications Commission in promoting telecommunications capacity building in developing nations.

IV. USAID EXPERIENCE IN TELECOMMUNICATIONS

As the principal U.S. agency for bilateral assistance, USAID's overarching objective is the promotion of sustainable development in developing countries. To achieve this end, USAID maintains four strategic objectives: protecting the environment, building democracy, stabilizing world population growth and protecting human health, and encouraging broad-based economic growth. To a limited degree the Agency has fostered telecommunications capacity building in developing nations. It also has employed development telecommunications applications as a means of promoting its strategic objectives.

For FY93, the most recent year for which data is conclusive, the Agency's activity and special interest coding system (AC/SI) identifies 11 projects with obligations totalling approximately US\$34 million in support of telecommunications modalities and networks. Of this amount, \$30 million is obligated for activities in Egypt (includes physical infrastructure investments). There are also numerous telecommunications activities carried out under various projects or programs that are captured by the AC/SI coding system. As a result, the number of activities and level of funding for USAID-supported telecommunications activities are much higher than indicated by the Agency's electronic budget coding system.

USAID TELECOMMUNICATIONS ACTIVITIES MATRIX

The following matrix (see pp. 18-22) provides a broad overview of the nature and scope of recent and current USAID activities in the telecommunications arena. This inventory is the result of an extensive search of the USAID Development Information System (DIS) and an Agency-wide request for project

information, and expands on the number of projects identified through the AC/SI coding system. The matrix identifies the project title, number, country or region of focus, and the duration of each activity in the telecommunications sector active during or after fiscal year 1989. In addition, each project is categorized as a telecommunications capacity building (TCB) or development telecommunications application (DTA) activity. To clarify the nature of the activity, further sub-categorization is provided. Since these specific categories were not considered during project design, however, many activities can be included in more than one category while others remain difficult to categorize. A brief description of each activity identified in the matrix is included in Appendix A.

The matrix indicates that USAID activities are relatively evenly divided between telecommunications capacity building (20 activities) and development telecommunications applications (23 activities). The lack of exact budget figures makes it difficult to identify the relative weight of each programmatic aspect although it is suspected that telecommunications capacity-building activities receive a far higher budgetary percentage. The matrix also shows that only five of the 20 telecommunications capacity building activities maintain a capital projects component, with the remainder falling under the overarching category of institutional and policy reform. Defacto, therefore, institutional/policy reform can be considered during the analysis period the primary emphasis of the USAID telecommunications portfolio.

Recent and Current USAID Telecommunications Projects by Region

Asia/Near East

| Project Number | Project Title | Region/ Country | Fiscal Years | TCB ¹ | DTA ³ |
|----------------|--|--------------------|--------------|------------------|------------------|
| 2630177 | Telecommunications IV | Egypt | 86-92 | CP,IPR | |
| 2630223 | Telecommunications Sector Support | Egypt | 93-97 | CP,IPR | |
| 2630627 | Commodity Import Program | Egypt | 93 | CP | |
| 4920452 | Philippines Assistance Program Support | Philippines | 90-95 | IPR | |
| 4920458 | Capital Infrastructure Support | Philippines | 90-93 | CP | |
| 4920447 | Capital Market Development | Philippines | 92-93 | | EG |
| 4920420 | Rural Infrastructure Fund | Philippines | 87-92 | CP | |
| 3860507 | Center for Technology Development | India | 88-95 | | EG |
| 4970360 | Financial Markets Project | Indonesia | 88-96 | IPR | |
| 4930341 | Emerging Problems of Development II | Thailand | 85-90 | IPR | |
| 4990009 | Regional Agribusiness Support | Asia Reg. | 92-97 | | AG,EG |

| | | | | |
|---------|--|---------|-------|----|
| 6080223 | Family Planning, Maternal and Child Health Phase V | Morocco | 93-98 | HP |
|---------|--|---------|-------|----|

Recent and Current USAID Telecommunications Projects by Region

Africa

| Project Number | Project Title | Region/ Country | Fiscal Years | TCB ² | DTA ³ |
|----------------|---|--------------------|-----------------|------------------|------------------|
| 6980463 | Human Resources Development Asst. | Africa Reg. | 87-98 | IPR | |
| 6900270 | Regional Drought Emergency Relief | SARP | 92-93 | | CC |
| 6900274 | Reg. Telecom. Restruct., Core Proj. | SARP | 94-99 | IPR | |
| 6900278 | Regional Telecommunications Restructuring, National Programs | SARP | 94-99 | IPR | |
| 6250973 | Sahel Water Data Management III | Sahel Reg. | 87-97 | | E |
| 6980478 | Policy, Analysis, Research and Technical Support (PARTS) | Africa Reg. | 91-98 | | AG, E |
| 6980466 | Famine Early Warning System | Africa Reg. | 89-94 | | CC |
| 6230002 | Inter-government Authority for Drought and Development | REDSO/EA | 88-89 | | E |
| 6880248 | Community Health and Population Services | Mali | 91-97 | | HP |

Recent and Current USAID Telecommunications Projects by Region

NIS/CEE

| Project Number | Project Title | Region/ Country | Fiscal Years | TCB ³ | DTA ³ |
|----------------|--|--------------------|-----------------|------------------|------------------|
| 1100005 | Private Sector Initiatives | NIS Reg. | 93-94 | IPR | |
| 1100007 | Democratic Pluralism Initiatives | NIS Reg. | 92-96 | | DG |
| 1800026 | Competition, Policy, Laws and Regulations | CEE Reg. | 92-95 | IPR | |
| 1800028 | American Business and Private Sector Development Initiative | CEE Reg. | 92-95 | IPR | |
| 1800032 | Nongovernmental Organization Development | CEE Reg. | 93-94 | IPR | |
| 1800045 | Participant Training | CEE Reg. | 92-95 | IPR | |
| 1800249 | Audit, Evaluation and Project Support | CEE Reg. | 93-94 | IPR | |

Recent and Current USAID Telecommunications Projects by Region

Latin America

| Project Number | Project Title | Region/ Country | Fiscal Years | TCB ⁴ | DTA ³ |
|----------------|--|--------------------|-----------------|------------------|------------------|
| 5180019 | Non-Traditional Agricultural Exports | Ecuador | 84-94 | | EG |
| 5960147 | Economic Policy Research | ROCAP | 88-95 | | EG |
| 5190391 | Democratic and Electoral Processes | El Salvador | 92-94 | | DG |
| 5240316 | Strengthening Democratic Institutions | Nicaragua | 91-98 | | DG |
| 5240312 | Family Planning Expansion and Reorganization | Nicaragua | 91-96 | | HP |
| 5320185 | Emergency Rehabilitation | Jamaica | 89-NA | | CC |

Recent and Current USAID Telecommunications Projects by Region

Global

| Project Number | Project Title | Region/ Country | Fiscal Years | TCB ⁵ | DTA ³ |
|-----------------------------|--|--------------------|--------------|------------------|------------------|
| 9400001 | Program Development and Support | Global | 82-C | | TI |
| 9400016 | Privatization and Development | Global | 89-95 | IPR | |
| 9400102 | Center for Trade and Investment Services | Global | 92-96 | | E, TI |
| 9365838 | United States Telecommunications Training Institute | Global | 90-C | IPR | |
| 9365063 | University Development Linkages | Global | 91-96 | | ED |
| 9365451.1 | International Foundation for Electoral Systems | Global | 91-96 | | DG |
| 9365743 | Energy Efficiency | Global | 92-99 | | E |
| 9684208, -4218, -4213 | Foreign Disaster Assistance; Satcom Billing, Satcom Equipment, Miscellaneous Communication Equipment | Global | NA | | CC |

TELECOMMUNICATIONS CAPACITY BUILDING

Telecommunications capacity building comprises those activities that promote sector development through direct financing of capital infrastructure, creating an enabling environment through institutional and policy reform, and training to increase telecommunications awareness and expertise among indigenous technical experts and policy-makers.

Capital Projects

The Agency has implemented capital infrastructure projects in telecommunications in Latin America, Africa, Asia, and the Near East. Although several of the following activities are not identified in the preceding matrix because they were completed prior to 1989, they are illustrative of USAID capital projects (project number and years in parentheses) in the telecommunications sector.

- ! **Lake Chad Basin Telecommunications** (6250050/FY 74-81). Grants provided to install a multipair cable and microwave connections to promote economic integration between Chad, Cameroon, and Nigeria.
- ! **Madagascar Telecommunications Phase II** (6870035/FY73-77). Loan provided to finance the foreign exchange costs of materials and procurement services required for the expansion and modernization of the Malagasy telecommunications facility.
- ! **Capital Infrastructure Support, Rural Infrastructure Fund** (4920458 FY90-93, -0420 FY87-92). Created a Concessional Financing Facility (CFF) to finance U.S. goods and services for telecommunications infrastructure projects. The project helped to capitalize the CFF administered by the Ex-Im Bank. USAID also provided long-term technical assistance (TA) to help Philippine agencies utilize the CFF, as well as short-term TA for infrastructure sub-projects. In addition, USAID created a rural infrastructure fund to upgrade and expand infrastructure in several sectors including telecommunications.

USAID support for telecommunications infrastructure is strongest in Egypt, where four projects have been completed and a fifth that maintains a capital projects component is presently underway. Upon completion of these activities USAID will have provided:

- ! equipment to replace 10 obsolete mechanical switching systems with electronically controlled analog switching systems;
- ! equipment and materials to expand and rehabilitate associated cable networks;
- ! digital switching systems and associated outside plant networks to serve three new exchanges;
- ! rehabilitation of the cable network;
- ! an increase of over 600,000 in the number of telephones lines;
- ! an increase in the number of communities connected to the direct dial network from seven to 189;
- ! an increase in the number of international circuits from 820 channels to 5,560;

! microwave links throughout the country.

When the "Telecommunications Sector Support Project" (263-0223) is completed in FY 1997, USAID will have provided approximately US\$544 million in assistance through the five identified projects and the commodity import program.

The overall impact of this ongoing sector support is that both the capacity and performance of the telecommunications system has improved dramatically. There are numerous anecdotal accounts of the contribution of the improved telecommunication system to private sector development (Lieberson et al., 1994:A-8,A-9):

- ! Federal Express was unable to provide delivery service in Egypt until the local licensor had a phone and was able to log into the FedEx worldwide data network.
- ! Shortly after the telecommunications upgrade in 1983, Pfizer Pharmaceutical undertook a US\$4 million expansion of its Egyptian manufacturing facility.
- ! Cairo hotels were able to maintain higher occupancy rates and tour agents in the United States were better able to arrange and make changes in package tours.
- ! During the period, tourism has developed as Egypt's primary source of foreign exchange.

More concrete evidence is provided in a 1994 Center for Development Information and Evaluation (CDIE) economic and financial analysis of USAID telecommunications projects in Egypt. The report concludes that the first three projects showed an economic internal rate of return of 11 percent, an economic benefit-cost ratio of 1.06, and an economic net present value of \$32.73 million.

Furthermore, external benefits were not quantified and thus it can be concluded that the overall rates of return to the economy are probably much higher. Primarily because of continuing inappropriate tariff policies, the internal financial rates of return (one percent) of the three projects were judged unsatisfactory (Lieberson et al. 1994:32-41). These inappropriate tariff policies persisted despite the fact that each capital project in Egypt was subject to conditionality in regard to policy and regulatory reform.

Despite the apparent difficulty in promoting appropriate policy reform in Egypt, the telecommunications sector has benefitted greatly. At present, the sector is implementing reforms at an increased level and the Telecommunications Sector Support Project is likely to hasten this progression. Telecommunications is now one of the most viable sectors in the Egyptian economy.

Institutional/Policy Reform

In other countries, USAID is promoting institutional and policy reform to improve management and regulation, enhance economic viability, and engender increased private sector participation in activities that do not have a capital projects component. The large number of activities in this category reflects the preferred direction of the Agency in the area of telecommunications capacity building. Current examples of USAID activity in this area include the following:

- ! **Regional Telecommunications Restructuring** (6900274/FY94-99). This activity provides technical assistance and training to help introduce competition, privatization, and sector restructuring to member countries of the Southern Africa Development Community (SADC). The first national program under this regional effort will be implemented in Tanzania. This near-term effort is based on the assumption that the best way to ensure effective sector-wide regulatory reform is to approach the reform objectives through a specific private sector operational challenge. Consequently, the project has been designed to achieve sector-wide regulatory reforms and project specific operational objectives simultaneously (USAID, 1994:29-30).
- ! **Privatization and Development** (9400016/FY89-95). Under the Privatization and Development project, USAID is promoting economic efficiency and growth by assisting developing nations to privatize state-owned assets. Through buy-ins by USAID missions, technical assistance to assist in privatizing the telecommunications sector is being, or has been, provided in Nicaragua, Honduras, Zambia, Indonesia, and in the Southern Africa region.
- ! **Private Sector Initiatives** (1100005/FY93-94). The U.S. State Department's Communications Information Program (State/CIP) provides, under an Interagency Agreement with USAID, telecommunications policy reform technical assistance, including the organizing of seminars on basic telecommunications legislation, tariff regime, mobile communications, packet switching, and regulatory issues.
- ! **Competition, Policy, Laws and Regulations; American Business and Private Sector Development Initiative** (1800026/FY92-95, 180028/FY92-93). This activity organized a Telecommunications Policy Laws Regulators seminar aimed at restructuring the telecommunications sector by engaging the legislators formulating the new telecommunications laws in discussion. In addition, it fosters the development of telecommunications infrastructure in the Newly Independent and Central and Eastern European States (NIS/CEE) by creating a business environment conducive to private investment in the sector.
- ! **USTTI** (9365838/FY90, 1800045/FY92-95, 1800249/FY93-94). Through cooperative agreements with the Office of Energy and Infrastructure and the Central and Eastern Europe Regional Office, short term training is provided to technical experts and policy-makers in the areas of telephone systems, satellite transmissions, data communications, and computers.

The project examples cited above exhibit the wide range of technical assistance USAID has provided for institutional and policy reform in the sector. Projects are in place to promote the enabling regulatory and policy environment for telecommunications capacity building, and, both directly and indirectly, increased participation by the private sector. Needed training is also being provided to technical personnel and policy-makers in developing nations.

Because Agency provision of institutional support to the telecommunications sector is recent, with the exception of Egypt, there are currently no studies evaluating the success or lessons learned from this type of activity. The lessons learned from Egypt in this area, however, could prove useful to project officers in other countries. These lessons include the importance of:

- ! regulatory and price reform;
- ! strengthening management of public utilities;
- ! training line workers and managers;
- ! incorporating concepts of cost recovery into operations and management;
- ! documenting the contribution of telecommunications to private sector development.

DEVELOPMENT TELECOMMUNICATIONS APPLICATIONS

Telecommunications development is a means to achieving USAID's strategic objectives: protecting the environment, building democracy, stabilizing population growth and protecting human health, and encouraging broad-based economic growth. Examples of USAID activities in these areas are discussed below.³

Protecting the Environment

As a result of deforestation, rapid urban growth, depletion of croplands, and other threats, the ability to assess quickly and accurately the state of the world's forests, farmlands, and oceans is vital to slowing and reversing damage to the global environment. USAID has funded numerous projects that use satellite remote sensing to monitor local environmental conditions and to help manage land use in developing countries. A few examples of USAID-supported projects incorporating satellite remote sensing include:

- ! **Central Selva Resource Management II** (5270321/FY88). The overall goal of this project was to test technologies for improved land use in Peru's Palcazu Valley. One component of the project focused on helping native communities in the valley enforce laws regulating forest use. Satellite imaging along with aerial photography provided the communities with detailed land maps used to identify unauthorized land use.
- ! **Inter-Governmental Authority for Drought and Development** (6230002/FY88-89). USAID provided a minicomputer and satellite-image processing software to the Regional Center for Services in Surveying, Mapping, and Remote Sensing (RCSSMRS), located in Kenya. The project was designed to help strengthen RCSSMRS's ability to monitor seasonal

³ USAID also employs telecommunications in its daily activities as a means of increasing its own organizational efficiency. For a discussion of internal telecommunications applications see Appendix B.

crop conditions in relation to flooding, soil erosion, forest depletion, and pastoralism, thereby improving the Center's capacity for early warning of food shortages.

- ! **Masoala Conservation and Development** (6870104/FY88). This project established a national park on Madagascar's Masoala Peninsula, where large areas of undisturbed natural habitats contain a wealth of biodiversity. Satellite imaging augmented onsite surveys and socioeconomic studies in the design of the park.

USAID evaluations of remote sensing projects indicate that they provide a very cost-effective technical intervention in support of natural resource management. In most projects, the remote sensing equipment operated as planned and reliably provided invaluable data. Most problems in remote sensing projects were related to the need for more effective training of technicians using the sensing hardware and to the lack of organizational ability to manage and disseminate downloaded data effectively.

Building Democracy

Telecommunications play a key role in promoting democracy in developing countries by diffusing various opinions and political views across a greater range of the citizenry than would otherwise be possible. Populations of developing countries are often spread over great distances. Radio and television can reach large numbers of people in the most remote areas. In urban environments, where newspapers and printed material can be used to disseminate diverse viewpoints, communication via radio and television has the advantage of being understood by illiterate persons.

In general, USAID democratization projects have incorporated telecommunications in four ways. First, independent radio and television stations have been encouraged as a fora for the free exchange of widely divergent political ideas separate from state-owned media networks. Second, radio and television have been used as social outreach tools to encourage greater levels of voter registration. Third, USAID has provided the means for pro-democracy organizations to conduct grass-roots education campaigns via mass media, thereby helping to instill democratic ideals into the mass consciousness. Fourth, USAID has provided technical support for the implementation of electronic balloting systems, improving the efficiency and timeliness of elections while at the same time presumably cutting down on opportunities for fraud.

USAID has used telecommunications in numerous democratization projects including:

- ! **Democratic Pluralism Initiatives** (1100007/FY92-96). USAID is financing the establishment of independent television and radio stations within the Newly Independent States (NIS) of the former Soviet Union. As the NIS move from a one-party, authoritarian regime to a multi-party democracy, independent media will provide crucial fora for the free exchange of ideas and for government-citizen interaction.

! **Democratic and Electoral Processes** (5190391/FY92-94). Increased voter registration and participation, especially among women, young adults, and the poor, was a major element of this project's goal of promoting lasting democratic institutions and processes in El Salvador. The project incorporated television and radio spots to encourage greater citizen participation in the electoral process. USAID also provided computer support to improve the voter registration and documentation process.

! **Strengthening Democratic Institutions** (5240316/FY91-98). In addition to grassroots broadcast media campaigns to improve civic education, this project includes funding to provide Nicaragua's National Assembly with an electronic voting system as well as training to transform the state-owned Radio Nicaragua into a contemporary public radio station.

International Foundation for Electoral Systems (IFES) (936541.1/FY91-96). A component of the USAID grant to IFES will be used to establish a computer-accessible Elections Information Resource Center. This on-line system will enable users worldwide to dial-up and review election laws, observer reports, a roster of election experts, and election equipment vendors.

Given the relative newness of USAID democracy initiatives, there are few evaluations of related projects. Therefore it is too early for lessons learned.

Stabilizing Population Growth/Protecting Human Health

Most USAID projects devoted to the interrelated goals of reducing population growth and improving health in developing countries rely heavily on telecommunications technologies. Progress in this strategic area is based on modifying behaviors on a mass scale, whether by encouraging the use of birth control or fostering sound preventative health practices. Radio, television, and other social marketing tools provide important means to effect such changes.

In addition to social outreach, USAID population and health projects use other telecommunications technologies such as computer databases to improve the distribution of medicine, condoms, and other material essential to the projects. These technologies also provide the means by which to track more accurately outbreaks of disease and famine and to train health care workers. Examples of telecommunications use in USAID population and health projects include:

! **Family Planning Expansion and Regionalization** (5240312/FY91-96). This project is aimed at expanding and strengthening the delivery of family planning services in Nicaragua by the private nonprofit PROFAMILIA. As part of the project, PROFAMILIA is creating a Social Communications Unit which will use mass media campaigns to foster better child care, sex education, and community-based distribution of contraceptives.

- ! **Family Planning Maternal and Child Health, Phase V** (6080223/FY93-98). The principal goal of this project in Morocco is to improve the health of children under the age of five and of women of childbearing age. The project will develop a computer database to target segments of the population that are underserved by health outreach services and will fund radio and television public service announcements to encourage the use of expanded health services and to educate the population on maternal health and family planning issues.
- ! **Community Health and Population Services** (6880248/FY77-91). The objective of this project in Mali was to improve family health service delivery. In addition to social outreach through mass media, the project implemented a new MIS system to improve the collection and dissemination of health statistics and commodity distribution data. This system will use computers and two-way radios contributed by the project.

Some lessons learned about the use of media outreach programs in population and health projects include:

- ! Adequate research of target audiences must be done in order to select the most appropriate strategies and monitor the effectiveness of communications programs.
- ! Although broadcast media provides the greatest frequency and outreach to certain segments of the population, printed material is more appropriate and productive in certain cases—for example, when very detailed information is required or when the material is needed for quick reference at home.

Education

Since the 1960s, USAID has used communications, including radio schools and television images, to improve educational opportunities in rural areas of developing nations. It was not until the mid-1970s, however, that the Agency began to explore the potential of two-way communications in education. This shift was facilitated by the **AID Rural Satellite Program** (9365811/FY77-88).

Two of the three pilot projects carried out under the program emphasized educational application. The experience of the SISDIKSAT Distance Education Project in Indonesia underlines the vast potential for two-way communications in rural education. The project linked ten distant and remote universities with a telephone-based "electronic classroom," providing rarely available academic courses to university students, upgrading faculty knowledge and teaching skills through in-service training programs and seminars, and facilitating administrative and institutional communication. The strong demand for these services indicates the benefits perceived by recipients.

- ! Classes averaged 91 minutes of attendance per week with 31 minutes for student questions, compared to regular course which allotted 65 and 4 minutes respectively.

- ! The schedule was almost fully booked from 8 a.m. to 5 p.m. for classes and training, and network use actually began two hours earlier for administrative purposes.
- ! Two universities have constructed new facilities in which to conduct SISDIKSAT classes and two others have requested special evening courses.
- ! Ninety-five percent of local student tutors claimed that students learned more through distance courses than through regular courses.

Sector-Specific Economic Development

Telecommunications capacity building as discussed in previous sections is increasingly becoming a prerequisite for economic development. In addition to supporting telecommunications capacity building through capital projects and regulatory/policy reform, USAID has conducted numerous activities which employ development telecommunications applications to increase economic opportunities in specific sectors. Examples include:

- ! **Capital Markets Development** (4920447/FY92-93). In the Philippines, this project was designed to enhance the efficiency of the securities market by automating trading operations, integrating the two stock markets in operation, upgrading regulatory functions, and improving the quality and transparency of information available to capital market participants. Market information services were created to gather investment information and provide it on a fee basis through a data-telecommunications network.
- ! **Non-traditional Agricultural Exports Project** (5180019/FY84-94). One component of the project was the creation of a self-financing, computerized trade and investment intermediation service to link exporters with clients.
- ! **Asia-Near East Regional Agribusiness Project** (499009/FY92-97). This activity includes a component to provide Asian USAID agribusiness projects with regional and global market information, and to assure a widely accessible system to collect and deliver current market prices for high value horticultural products. In addition to more conventional means, the information will be available via dial-up modem and on a fax-back basis.
- ! **Economic Policy Research** (5960147/FY88-95) This project is aimed at supporting economic policy reform through expanded public policy dialogue and knowledge of economic issues. One component of this project focuses on improving the ability of the Permanent Secretariat for Central American Economic Integration (SIECA) to act as a bank for economic reporting and statistical data for Central America. The project provides training for SIECA and national research centers in computer use and data analysis.

Such activities can provide clear benefits to targeted sectors if designed and implemented appropriately. In the case of the Non-Traditional Agricultural Export project in Ecuador, however, evaluators concluded that although the project did succeed in establishing an informational base which can be

expanded, the project failed to provide or develop the means to analyze the information, market news, and research collected. This finding illustrates the importance of including a training and technical assistance component in any such project.

V. FINDINGS & CONCLUSIONS: A USAID Perspective

Because there are so few evaluations of USAID telecommunications activities, it is difficult to draw specific technical conclusions from this broad overview. However, the following are intended to provide some input to policy level decision-makers as well as project officers.

- ! There is a clear link between telecommunications and USAID's strategic objectives. At present USAID lacks both a policy framework for telecommunications and an internal mechanism to track and monitor its activities in telecommunications activities. A USAID Policy Determination on telecommunications, entitled *Telecommunications and the Global Information Infrastructure*, is, however, currently in draft stage. The creation of an evaluation and monitoring system is essential to ensure appropriate policy-making decision in the area.
- ! Examination of USAID projects indicates that institutional reforms rather than capital projects have been the dominant form of intervention in support of telecommunications capacity building. Such interventions can yield widespread benefits to the economy and may be more palatable than capital infrastructure projects.
- ! Development telecommunications applications can increase the effectiveness of donor organizations and their host country partners in achieving sustainable development goals. They also enhance the impact of specific interventions. Experience has demonstrated that these applications are most effective when combined with a strong training component.
- ! USAID's in-country presence and wide-ranging experience with telecommunications activities provides the Agency with the opportunity to play a key role in USG telecommunications activities in developing nations.

In general, our findings indicate that USAID's activities are consistent with the principles for the creation of the Global Information Infrastructure set forth by Vice President Gore. The Agency presently is conducting numerous activities to create an appropriate regulatory and policy environment for telecommunications capacity building; to promote directly and indirectly increased private sector participation; and to employ development telecommunications applications to advance its strategic development objectives.

APPENDIX A

USAID TELECOMMUNICATIONS INVENTORY

The following are brief descriptions of those projects identified in the project matrix. Identified projects, with a telecommunications component, active during or after FY 1989 are included.

Asia/Near East

- (1) Egypt, "Telecommunications IV" (2630177, FY 86-92): Provided the government of Egypt with technical assistance, training, and equipment for seven new digital telephone switching systems in Cairo with a total of 205,000 telephone lines to improve service for over one million residents. Also financed the Outside Plant network system for these switching sites. A Centralized Operation and Maintenance (COM) system was also financed in this project. Total funding was \$82 million.
- (2) Egypt, "Telecommunications Sector Support" (2630223, FY 93- 97): Follow-on to 2630054, -0075, -0117, -0177, to continue developing the capabilities of the Arab Republic of Egypt National Telecommunications Organization (ARENTO). Project will promote policy/institutional reform and fund infrastructure development. Infrastructure development will include: (a) a mix of digital switching systems and associated outside plant networks, (b) replacement of obsolete crossbar switching systems, and (c) hardware, software, and auxiliary systems for a new Network Operations Center. The institutional/policy reforms will include the modernization of ARENTO's operating procedures and management policies in regard to autonomy of operation, employee retention, and staff development; pricing strategies to ensure an adequate return on investment and generation of sufficient cash to cover Operations & Management (O&M). The total funding over the next six years is \$200 million.
- (3) Egypt, "Commodity Import Program" (2630627, FY 93): Provided \$5.7 million to finance 20,000 telephone lines.
- (4) Philippines, "Capital Infrastructure Support" (4920458, FY90-93): Project set up a concessional finance facility (CFF) to finance U.S. goods and services for infrastructure projects in several sectors including telecommunications. The project helped to capitalize the CFF which was administered by the Ex-Im Bank. USAID also provided technical assistance (TA) to help Philippine agencies utilize the CFF, as well as short term TA for infrastructure sub-projects.
- (5) Philippines, "Capital Market Development" (4920447, FY92-93): Project to enhance the efficiency of the securities market in the Philippines by automating trading operations, integrating the two stock exchanges operating in the country, upgrading regulatory function, and improving the quality and transparency of information available to capital market participants. One

component of this project is to establish market information services to gather investment information and make it available to the investment public on a fee basis through a data-telecommunications network.

- (6) Philippines, "Rural Infrastructure Fund" (4920420, FY87-92): Project created a fund to upgrade and expand infrastructure in several sectors including telecommunications.
- (7) Philippines, "Philippines Assistance Program Support" (4920452, FY90-95): This wide ranging multi-donor project to help the government of the Philippines develop economic infrastructure and stimulate investment nationwide included activities in the area of telecommunication policy reform.
- (8) India, "Center for Technology Development" (3860507/FY88-95): Project to promote the development and commercial use of technology by establishing a regional Center for Technology Development. In addition to other activities, the project financed technical information exchange through the use of satellite communications channels to obtain technical and commercial information from U.S. libraries and universities and to share research findings.
- (9) Thailand, "Emerging Problems of Development II", (4930341/FY85-90): USAID entered into a PASA with the NTIA to carry out a sector strategy study to determine and identify if Thailand's telecommunications needs were being met and to identify weaknesses and, make recommendations for infrastructure that would optimize telecommunications services.
- (10) Asia Regional, "Regional Agribusiness Project" (4990009/FY92-97): A component of this project is to provide Asian USAID agribusiness projects with regional and global market information, and to assure a system, widely accessible to anyone in the region, to collect and deliver current market prices paid for high value horticultural products of potential interest to Asian agribusiness. The global market information is available on a fax-back system at the project's FINTRAC headquarters in Washington. The project is working with UNCAD/MNS to develop the market price service. Delivery will be through dial-up modem, fax-back, periodic fax, and mailing.
- (11) Indonesia, "Financial Markets Project" (4970360/FY88-96): Providing financial, regulatory and transaction-related advice to the government of Indonesia Ministry of Finance for the privatization of PT Indosat (the primary international carrier) and PT Telkom (the primary domestic carrier). Short term TA has been provided under the "Privatization and Development Project" (9400016).
- (12) Morocco, "Family Planning Maternal and Child Health, Phase V (6080223/FY93-98): The principal goal is to improve the health of children under five and women of child bearing age in Morocco. To help reach segments of the society that are underserved by health outreach

services, the project will develop a computer database to target these groups. The project will also provide funding for television and radio spots to educate the population about maternal health and family planning issues and to encourage the use expanded health services.

Africa

- (13) Africa Regional, "Human Resources Development Assistance" (6980463/FY87-98): Under this regional training project, two grants were provided to George Mason University to fund "AFCOM 92: The first U.S.-Africa Communications Conference, Building Partnerships for the 90s", and "AFCOM 93" the subsequent follow-up conference.
- (14) Southern Africa Regional, "Regional Drought Emergency Relief" (6900270/FY92-93): Project enhanced drought and food emergency management as well as related infrastructure including telecommunications.
- (15) Southern Africa Regional, "Regional Telecommunications Restructuring, Core Project" (6900274/FY94-99): TA and training to introduce competition, privatization, and sector restructuring to member countries of SADC.
- (16) Southern Africa Regional, "Regional Telecommunications Restructuring, National Restructuring Programs" (6900278/FY94-98): The first national program of the core project described above will be implemented in Tanzania. Project will introduce sector programs to directly introduce competition, privatization and sector restructuring. Will capitalize a second telecommunications company through a joint venture between U.S. and Tanzanian private sector entities. Project will also include the purchase of approximately \$18.5 million worth of U.S. telecommunications equipment.
- (17) Sahel Regional, "Sahel Water Data and Management III" (6250973/FY87-97): Multi-donor project to support existing programs to collect, analyze, and disseminate weather, climatic and hydrological data for crop forecasting purposes. The World Meteorological Organization will implement the project; USAID will fund hardware, software, TA, and training for data processing, remote sensing, and telecommunications.
- (18) Africa Regional, "Policy, Analysis, Research and Technical Support (PARTS)" (6980478/FY91-98): Project to increase the use of information and analysis by African decision-makers and the USAID Africa Bureau in designing and implementing agriculture and natural resource policies, programs and projects.
- (19) Africa Regional, "Famine Early Warning System" (6980466/FY89-94): Project created the Rapid Emergency Logistics Information Exchange Forum (RELIEF) to promote coordination and sharing of information. RELIEF is the successor to SAFIRE, a pilot project jointly

conceived by USAID and the U.N.'s World Food Program (WFP). It linked 25 cities in six African countries with the United States, Italy, and Switzerland. SAFIRE's primary objective was to improve famine relief through the coordination of donor and host country humanitarian assistance efforts.

- (20) REDSO/EA, "Inter-Governmental Authority for Drought and Development" (6230002/FY88-89): Provided minicomputer and satellite image processing software to the a Regional Center for Services in Surveying, Mapping, and Remote Sensing (RCSSMRS), located in Kenya. The project was designed to help strengthen RCSSMRS's ability to monitor seasonal crop conditions including flooding, soil erosion, forest depletion, and pastoralism thereby improving the Center's capacity for early warning of food shortages.
- (21) Mali, "Community Health and Population Services" (6880248/FY91-97): Objective is to improve family health service delivery in Mali. In addition to social outreach through mass media, the project will implement a new MIS system to improve the collection and dissemination of health statistics commodity distribution data. The system will employ computers and two-way radios contributed by the project.

New Independent States, Central and Eastern Europe

- (22) New Independent States (NIS) Regional, "Private Sector Initiatives" (1100005/FY93-94): The Department of State Communications and Information Program (State/CIP) provides, under an Interagency Agreement with USAID, telecommunications policy reform support working with the Regional Commonwealth in Communications and bilaterally with selected NIS countries. This activity organized telecommunications seminars on basic telecommunications legislation, tariff regime, mobile communications, packet switching, and regulatory issues. FCC and the U.S. private sector are involved in this program. State signed Memoranda of Understanding with Russia on Cooperation in Telecommunications and on Global Information Infrastructure Initiative which provide a framework for ongoing consultations.
- (23) NIS Regional, "Democratic Pluralism Initiatives", (1100007/FY92-96): USAID is providing funding to establish independent television and radio stations within the NIS. As the NIS moves from a one-party, authoritarian regime to multi-party democracy, independent media will provide crucial forums for the exchange of ideas and for governmental-citizen interaction.
- (24) Central and Eastern Europe (CEE) Regional, "Competition, Policy, Laws and Regulations" (1800026/FY92-95): In conjunction with State/CIP and with support from FCC and NTIA, this activity (a) organized Telecommunications Policy Laws Regulations seminars aimed at restructuring the telecommunications sector and at engaging in discussion the legislators formulating the new telecommunications laws, (b) offered Spectrum Management Seminars aimed at improving the process of allocation of radio frequencies for TV and radio broadcasting

so that frequencies can be made available to private operators, (c) provided funding through the Trade and Development Agency (TDA) for major policy/legal framework studies in the Czech and Slovak Federal Republic (CSFR) and Hungary to assist in restructuring the telecommunications sectors, and (d) funded workshops, studies, policy advisors and consultations for CEE telecommunications officials in Washington.

- (25) Central and Eastern Europe (CEE) Regional, "American Business and Private Sector Development Initiative" (1800028/FY92-95): Capital Development Initiative (CDI) Telecom activity fosters the development of telecommunications infrastructure in Central and Eastern European countries through creation of a business environment conducive to private investment in telecommunications and promotion of U.S. private investment in developmental telecommunications projects. An intensive program of policy interventions is being pursued. In the area of Rural Telecommunications Development, which is a high priority subsector of interest to the Central and Eastern European governments, it works closely with NGOs and private citizen groups interested in telecommunications capacity building and with appropriate telecommunications officials and members of parliament to amend the legal/regulatory framework to level the playing field for the budding private telecommunications operators vis-a-vis the entrenched state telecommunications monopolies. In particular, the issue of fair interconnection agreements is being given growing attention as a key issue in assuring sustainability of independent telecommunications operations. Other telecommunications subsectors selected for developmental emphasis are Data Communications, User Information Systems, Wireless Communications and Independent TV/broadcasting.

Development cost support grants have been competitively awarded to U.S. companies to help defray on a cost sharing basis the high expenses of telecommunications project development in CEE. Grants were awarded to ITEC International, Fail Telecommunications and USWest International.

- (26) Central and Eastern Europe (CEE) Regional, "Nongovernmental Organization Development" (1800032/FY93-94): Rural telephone cooperative development activity supported National Telephone Cooperative Association (NTCA) rural telephone development in Poland under grants from USAID. Two telephone cooperatives assisted by NTCA (Tyczyn and Wist) are in operation. NTCA effort contributed significantly to the acceptance of private ownership of telephone operations. NTCA is endeavoring to improve the regulatory environment for local telephone companies. The interconnection agreements with Polish Telecom are the main policy issue.
- (27) Central and Eastern Europe (CEE) Regional, "Participant Training" (1800045/FY93-94): Grant for USTTI Telecommunications training for participants from selected CEE countries. This activity is bringing dozens of CEE telecommunications managers for training in the United State. The training is donated by major U.S. telecommunications companies.

- (28) Central and Eastern Europe (CEE) Regional (1800249/FY93-94): Grant for USTTI Telecommunications training for CEE participants. This activity is bringing dozens of CEE telecommunications managers for training in the United States. The training is donated by major U.S. telecommunications companies.

Latin America and Caribbean

- (29) El Salvador, "Democratic and Electoral Processes" (5190391/FY92-94): Increased voter registration and participation, especially among women, young adults, and the poor, is a major element of this project's goal of promoting long lasting democratic institutions and processes in EL Salvador. The project is incorporating television and radio spots to encourage greater citizen participation in the electoral process. USAID is also providing computer support to improve the voter registration and documentation process.
- (30) Nicaragua, "Strengthening Democratic Institutions" (5240316/FY91-98): In addition to grassroots broadcast media campaigns to improve civic education, this project includes funding to provide Nicaragua's National Assembly with an electronic voting system, as well as training to transform the state owned Radio Nicaragua into a contemporary public radio station.
- (31) Nicaragua, "Family Planning Expansion and Regionalization", (5240312/FY91-96): This project is aimed at expanding and strengthening the delivery of family planning services by the private non-profit PROFAMILIA. As part of the project, PROFAMILIA is creating a Social Communications Unit, which will employ mass media campaigns to foster better child care, sex education, and community based distribution of contraceptives.
- (32) Jamaica, "Emergency Rehabilitation" (5320185/FY90--): Project to support emergency relief and rehabilitation caused by hurricane Gilbert. The project includes the purchase of equipment to restore telecommunications capabilities.
- (33) ROCAP, "Economic Policy Research", (5960147/FY88-95): This project is aimed at supporting economic policy reform through expanded public policy dialogue and knowledge of economic issues. A component of this project focused on improving the ability of the Permanent Secretariat for Central American Economic Integrations (SIECA) to act as a bank for economic reporting and statistical data for Central America. The project provides training for SIECA and national research centers in computer use and data analysis.
- (34) Ecuador, "Non-Traditional Agricultural Exports", (5180019/FY84-94): One component of the project was the creation of a self-financing, computerized trade and investment intermediation service to link exporters with clients.

Global

- (35) Global, "Program Development and Support" (9400001/FY82-C): Through an Economic Growth grant, USAID has provided crucial support to the development of UNCTAD's global computerized system of "Trade Points". The "Trade Points" are designed to expedite and lower costs of trade, especially for small businesses. USAID is also funding travel for trade ministers from the poorest nations to attend the World Summit to be held October 1994 in Columbus, OH.
- (36) Global, "Center for Trade and Investment Services" (CTIS) (9400102/FY92-96): CTIS provides information to U.S. businesses regarding opportunities in developing countries in numerous sectors including telecommunications. In conjunction with the United States-Asia Environmental Partnership (US-AEP), CTIS has established the Environmental Technology Network for Asia (ETNA) that electronically links U.S. environmental technology companies with trade leads in nine Asian countries.
- (37) Global, "Privatization and Development" (9400016/FY89-95): Project to promote economic efficiency and growth by assisting developing nations to privatize state owned assets. Through buy-ins by USAID missions, TA was provided for the privatization of the telecommunications sector in Nicaragua, Honduras, Zambia, Indonesia, and in the Southern African region.
- (38) Global, "Energy Efficiency" (9365743/FY92-99): Under this project, USAID initiated a global energy information dissemination effort known as the Global Energy and Environment Network (GLEEN) to promote the spread of environmentally sound technologies. GLEEN will strengthen the capacity of developing and post-communist country institutions, businesses, and individuals to access and disseminate energy and environmental information. This information will help all countries solve their common energy and environmental problems.
- (39) Global, "USTTI" (9365838/FY90-C): Project is designed to provide short term training in telecommunications and broadcasting for Third World technical experts and policy-makers. The program includes two to three week courses in telephone systems, satellite transmission, data communications, and computers.
- (40) Global, "International Foundation for Electoral Systems" (IFES) (936541.1/FY91-96): A portion of the grant to IFES from the USAID Center for Democracy will be used to establish a computer-accessible Elections Information Resource Center. This on-line system will enable users worldwide to dial-up and review election laws, observer reports, a roster of election experts, and election equipment vendors.
- (41) Global, "University Development Linkages Project" (UDLP) (9365063/FY91-96): This project supports collaborative partnerships between U.S. and developing country institutions of higher education for sustainable development within USAID priority areas. The UDLP has established a UDLP listserv for information sharing related to UDLP activities. The project is

also working to establish a global UDLP telecommunications network by facilitating access to E-mail connections between partner institutions.

- (42) Global, Office of Foreign Disaster Assistance (9684208): In support of efforts to coordinate humanitarian assistance in response to disaster-stricken countries, BHR/OFDA communications staff typically deploy INMARSAT satellite communications terminals with voice and data capabilities, VHR and/or hand-held radios and base stations, laptop computers and communications software to the field of BHR/ORDA's Disaster Assistance Response Teams (DARTs).

APPENDIX B: USAID INTERNAL USE OF TELECOMMUNICATIONS

USAID uses telecommunications in its day-to-day operations in order to improve organizational efficiency. Computer networks, data transmission, Internet, and other telecommunications technologies are used by businesses and governments at an ever increasing pace, helping their operations run more efficiently and allowing a greater degree of interaction and communication between employees. By taking advantage of new telecommunications technologies, USAID can overcome many of the obstacles presented by the great distances between its operations.

Most USAID direct-hires and some institutional contractors are now interconnected via Electronic Mail (E-mail). The advantages of E-mail over conventional mail or telephones are numerous. First, individuals connected to the system have the option of sending messages to many recipients at once, thus eliminating the need to make several phone calls or mail several letters. Second, documents in electronic form (e.g., WordPerfect documents and Lotus spreadsheets) may be attached to E-mails and retrieved by the recipient -- there is no need to print out or photocopy the document. Third, messages can be filed and managed electronically giving the user permanent electronic records of correspondence. Finally, E-mail is usually a faster means of communication than alternatives considering the frequency of missed phone calls, the tediousness of feeding paper into fax machines, and the inherent delivery time limitations of conventional mail.

There are challenges, however, that come along with the benefits of E-mail. The major problem faced by many is best called "communication overload" because of the large number of E-mail messages they receive, the problems inherent in responding to and managing so many messages, sorting out "noise" from useful communication, and so on. USAID, like many organizations, is undergoing a real cultural shift as it addresses both constraints and opportunities of the "information age".

Over the past year or so, USAID has begun to take advantage of the vast potential for communication offered by the Internet, a vast worldwide "network of networks" which links users to one another and to a worldwide array of public and commercial databases, to online services, to software sites, and to other computational and communications technologies.

At its most basic level, access to Internet provides Agency employees with the ability to communicate via E-mail with any of the millions of users around the globe. As a consequence, USAID users can share E-mail benefits with the rapidly expanding cadre of non-governmental organizations (NGOs), government agencies, and development experts who are connected to the Internet.

With its online databases and information resources, the Internet also provides USAID users with instant and convenient access to documentation (often full-text), statistics, and up-to-date news which was either unavailable or impractical to obtain only a few years ago. The possibilities for information retrieval seem boundless. A list of only a few of the Internet's offerings includes: full-text versions of

North America Free Trade Agreement and General Agreement on Trade and Tariffs; access to literally hundreds of library on-line public access catalogs (OPACs), including the Library of Congress catalog; access to the most recent version of the National Trade Database; and access to Econet, a global computer network devoted to the free exchange of information and ideas on the environment, participatory democracy, sustainable development, and related issues.

The Agency is also using a feature of the Internet called a "gopher". The gopher allows Internet users to access available databases, catalogs, and other sources of information through a menu-driven system. In addition to making the Internet much more user-friendly, the gopher eliminates the need to know arcane database addresses (such as the University of California's library OPAC's address of "192.35.222.222"). Instead, users can search by subject, quickly and conveniently changing from site to site. USAID's own gopher site allows the Agency to disseminate its objectives, public documents, and policy statements to Internet users around the globe.

The Agency is developing its presence on the World Wide Web (WWW), another feature of the information highway featuring graphics, video, sound, and linked (hypertext) documents and information. The Web is usually accessed by Mozaic or some other "web browser". USAID will have a "home page" accessible to the public in early 1995.

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DATABASE SEARCHES

Development Assistance Committee (DAC) Database.

Development Activity Information (DAI) Database.

International Development Research Centre (IDRC) Database.

USAID Development Information System (DIS) Projects database and Document Database.

World Bank Database.

³ Each activity is categorized as either telecommunications capacity building (TCB) or a development telecommunications application (DTA). The former are classified as capital projects (CP) (i.e., those which finance or technically assist direct investments in telecommunications equipment) or institutional/policy reform (IPR) (i.e., those which provide technical assistance and training to promote greater efficiency in the telecommunications sector, fostering increased competition and private sector participation). The latter DTA activities are classified according to the application's objective, that is, promoting: economic growth (EG); agricultural development (AG); civil conflict and disaster rehabilitation (CC); environmental sustainability (E); trade and investment (TI); democracy and governance (DG); health and population (HP); and education (ED).

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